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(71) Applicant: CALCO CLOTH S.R.L.  
Via Giardini 470, Scala H  
I-41100 Modena(IT)

(72) Inventor: Aggio, Giordano  
Via SS Trinità, 18  
I-41100 Modena(IT)

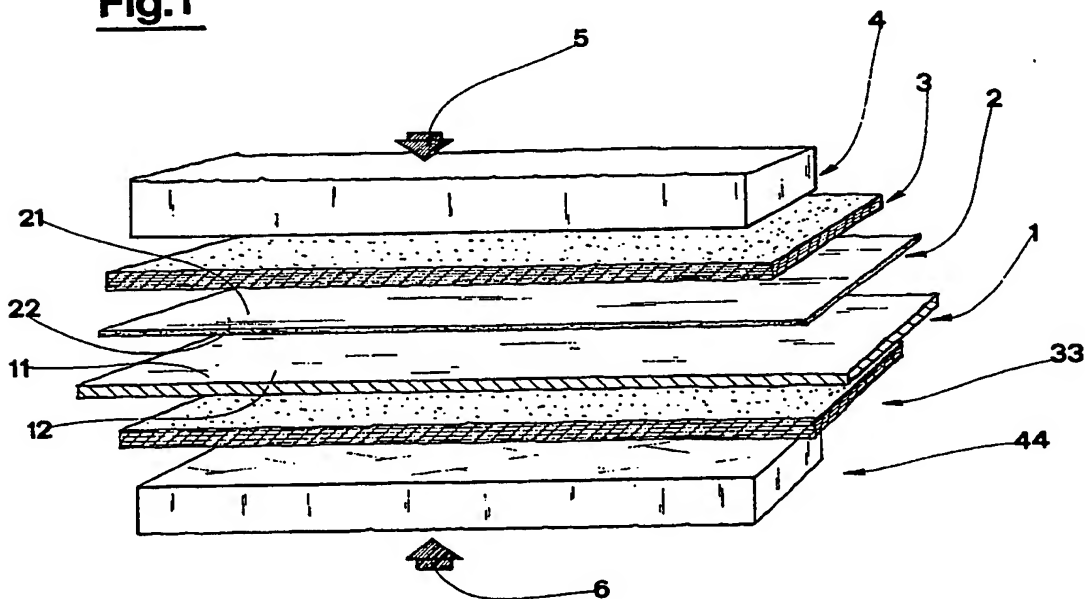
(74) Representative: Lanzoni, Luciano  
c/o BUGNION S.p.A. Viale Trento Trieste, 25  
I-41100 Modena(IT)

(54) A printing process, in particular for fabrics, leathers and similar materials.

(57) The process involves photocopying a black-and-white or colour image on a sheet of ordinary paper (2), appearing as the reverse of the image ultimately to be produced, then placing the copy side of the

sheet in direct contact with the surface of the fabric (1) and applying pressure and heat in such a way as causes the toner, from which the copy image is constructed, to transfer to the fabric.

**Fig.1**



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The present invention relates to a printing process suitable in particular for fabrics, leathers and similar materials.

The prior art in this field, and especially the field of quality print finishing, embraces methods which by their very nature and constitution are unsuited to cost-effective exploitation for limited and dissimilar production runs. As a general rule, in fact, the not inconsiderable cost of special print equipment needed for the particular operation (silkscreens etc.) must be spread directly over the unit cost.

To this cost must be added that of setting up the equipment, which is reflected in the time required, and the necessity of using specialized personnel. The object of the present invention is to provide a printing process, in particular for fabrics, that can be implemented easily using simple means and requires no preparation of special equipment as in the case, for example, of silk-screen processes.

The stated object is comprehensively realized in a process as characterized in the appended claims, which is ideally suited to short production runs and features great flexibility of use.

The invention will now be described in detail, by way of example, with the aid of the accompanying fig 1, which is an exploded view illustrating the arrangement of means utilized during one step of the method.

According to the invention, a black-and-white or colour image is reproduced on one surface 11 of a fabric 1, or rather, printed, by transferring the reverse image prepared previously on the surface 22 (preferably coated) of a sheet of paper 2.

The monochrome or colour reverse image is produced on the surface 22 of the sheet 2 by conventional photocopying, using ordinary paper. This operation need present no problems whatever, even in the case of a colour reproduction, as the state of the art now embraces machines that will photocopy in colour from prints or even from transparencies.

The paper sheet 2 is positioned with the surface 22 bearing the reverse image offered in uniform and flush contact to the surface 11 of the fabric 1, and with its opposite surface 21 covered by a thin backing layer of flexible material 3, a silicone elastomer for example, of uniform thickness.

A further uniform layer of flexible material 33 is laid beneath and in flush contact with the back surface 12 of the fabric 1.

The multilayer sandwich formed in this manner is compressed hot between two parallel plates 4 and 44 operated by a conventional press (not illustrated), as indicated by the arrows 5 and 6; at least the top plate 4 will be heated and maintained for

the duration of the pressing operation at a prescribed temperature, generally no higher than 200 °C, but at all events such as to ensure partial fusion of the toner from which the reverse image presented by the surface 22 of the sheet 2 is constructed. The pressing force will depend on the type of fabric 1 and is tied to the temperature and duration of the press stroke, which are both variable parameters.

The two flexible backing layers 3 and 33 will be fashioned from an elastically deformable material able to withstand the thermal stresses generated in pressing without undergoing change.

On completion of the pressing operation, the fused transfer sheet 2 and fabric 1 are separated from the backing layers 3 and 33, whereupon a solvent, for example a nitro based thinner such as those suitable for paints and varnishes, is applied to the exposed surface 21 of the transfer sheet 2 using light pressure in order to facilitate the separation of the toner, hence transfer of the image from the relative surface 22 of the sheet; thereafter, when the sheet 2 is lifted, the toner will be seen to have attached itself permanently to the surface 11 of the fabric 1, which thus bears the printed image.

With the transfer process complete, the printed image can be fixed using suitable chemical agents. The image produced in this manner is of optimum quality; moreover, the process according to the invention is characterized by great flexibility, inasmuch as it permits of reproducing any given image without the need to set up costly equipment such as dies, silkscreens etc., neither of which can generate more than one image at one time; what is more, colour silkscreen processes require one screen for each of the single colours.

## Claims

- 1) A printing process, in particular for fabrics, leathers and similar materials, characterized in that it comprises the following succession of steps:
  - producing a black-and-white or colour image on a sheet of paper (2) by conventional means;
  - placing the sheet of paper (2) directly over the material (1) to be printed, with the surface (22) of the sheet bearing the image offered flush to the surface (11) of the material destined to receive the image;
  - protecting at least one exposed surface of the united layers of paper (2) and material (1) with an elastically deformable, heat resistant and non stick backing layer (3, 33) of uniform thickness;
  - hot pressing the sandwiched layers by application of a force directed perpendicular to their surfaces

for a given duration at prescribed pressure and temperature;

-separating the backing layer (3, 33) from the united paper (2) and material (1);

-where appropriate, applying solvent under gentle pressure to the exposed surface (21) of the sheet of paper (2), still united to the material (1), to the end of facilitating separation of the toner or ink from the sheet;

-lifting the sheet (2) from the material (1);

-where appropriate, fixing the printed image which appears on the material (1).

2) A process as in claim 1, wherein the black-&-white or colour image is produced initially on a sheet of paper (2) by conventional photocopying methods utilizing ordinary paper.

3) A process as in claim 2, wherein the surface (22) of the sheet (2) bears a photocopied or otherwise reproduced image that is the exact reverse of the image to be transferred to the material (1).

4) A process as in claim 2, wherein the surface (22) of the sheet of ordinary paper (2) destined to receive the photocopied image is coated.

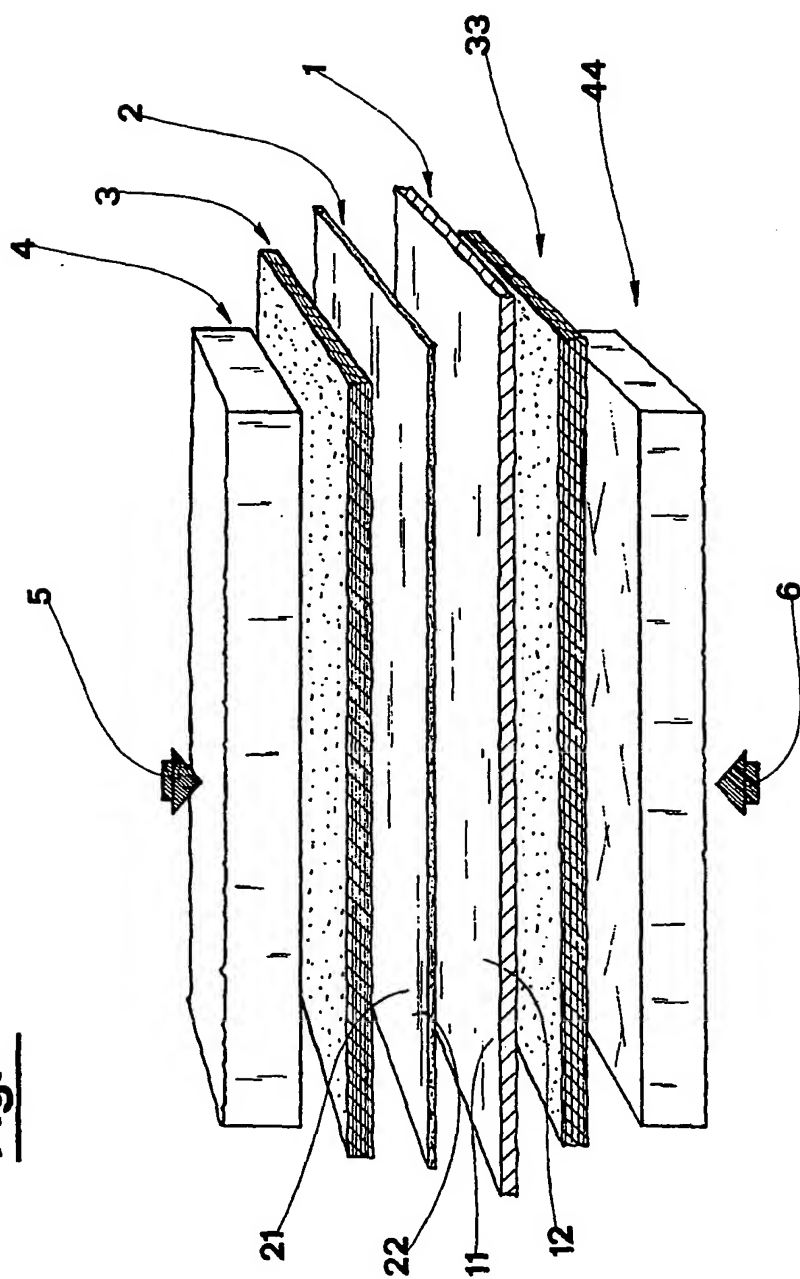
5) A process as in claim 1, wherein two elastically deformable backing layers (3, 33) of uniform thickness are applied one to each exposed surface of the united sheet (2) and material (1).

6) A process as in claim 2, wherein the elastically deformable backing layer (3, 33) of uniform thickness is substantially thin, and designed to invest the united sheet (2) and material (1) with thermal energy sufficient to produce the prescribed temperature at their joined surfaces.

7) A process as in claim 6, wherein the prescribed temperature is such as to produce at least partial fusion of the toner from which the reverse image is constructed.

8) A process as in claim 2, wherein the elastically deformable backing layer (3, 3) is a silicone elastomer.

**Fig.1**





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# EUROPEAN SEARCH REPORT

Application Number

EP 90 83 0124

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. CLS)
X	CHEMICAL ABSTRACTS, vol. 104, no. 18, 05 May 1986 Columbus, Ohio, USA ISE et al: "Transfer printing of fabrics" & JP 60230899 (16/11/1985) page 92; ref. no. 150745 * abstract *	1-1	D06P5/00
Y	-----	5-P	
Y	CHEMICAL ABSTRACTS, vol. 103, no. 24, 16 December 1985 Columbus, Ohio, USA KAWAKAMI: "Apparatus for transfer printing of fabrics" & JP 6035465 (Shin Meiwa Ind. Co. Ltd) (14/08/1985) page 65; ref. no. 197316 * abstract *	4-3	
A	-----		TECHNICAL FIELDS SEARCHED (Int. CLS)
	CHEMICAL ABSTRACTS, vol. 99, no. 24, 12 December 1983 Columbus, Ohio, USA "Toners for sublimation transfer printing" & JP 5887378 (Canon K. K.) (17/11/1981) page 81; ref. no. 196585 * abstract *		D06P5/00
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09 AUGUST 1990	Examiner DELZANT J-F.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		I : theory or principle underlying the invention F : earlier patent document, but published on, or after the filing date D : document cited in the application E : document cited for other reasons * : member of the same patent family, corresponding document	

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